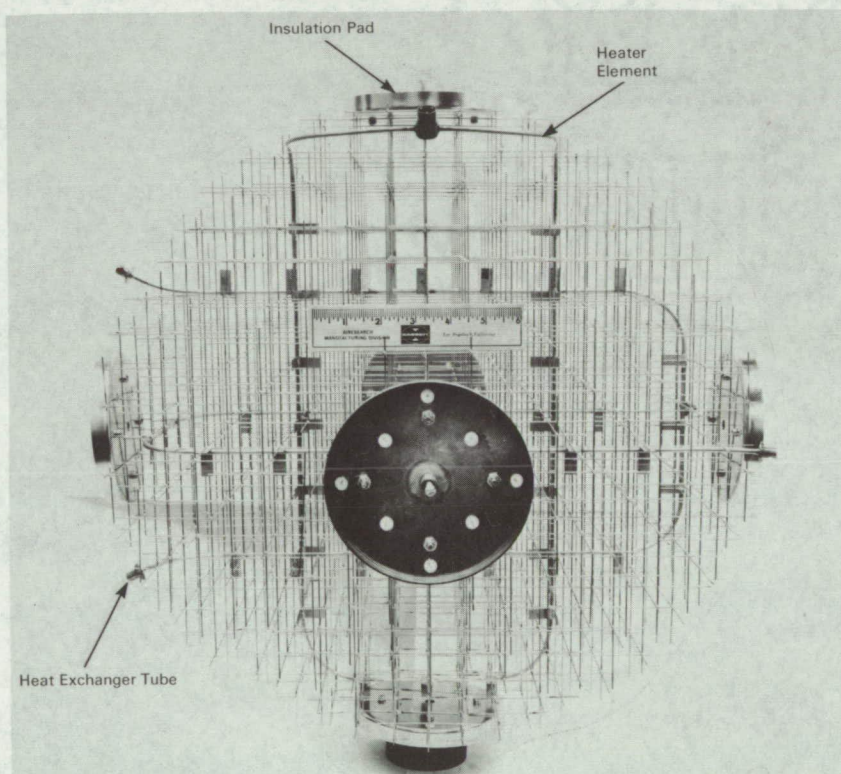


NASA TECH BRIEF



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Three-Dimensional Wire-Mesh Capacitor System Measures Fluid Density



The problem: To devise an instrument that will automatically measure the bulk density of a stored, electrically nonconductive fluid containing varying proportions of liquid and vapor.

The solution: A gaging system employing a three-dimensional wire-mesh capacitor whose capacitance varies with the bulk density of the fluid dielectric medium between the capacitor "plates".

How it's done: Each of the two "plates" of the capacitor consists of a cubical array of electrically interconnected wires. The wires comprising one of the cubical arrays are orthogonal to and electrically isolated from the wires in the other array. The two capacitor "plates" thus formed are kept at the proper spacing (1.25 inches between individual wires) by insulating pads attached (on one face) at the ends of the principal axes of the intermeshed cubical array and

(continued overleaf)

(on the other face) to the inner wall of the fluid storage vessel. Electrical leads to a capacitance measurement circuit and readout device are connected to each of the two capacitor plates. The scale of the readout device is calibrated to indicate the bulk density of the fluid (which is dependent on the proportion of gas and liquid) in the vessel.

Notes:

1. For application in a subcritical oxygen storage system, advantage was taken of the extended heat-transfer surface of the density gage by attaching electrical heating elements and heat exchanger tubing to the grounded side of the wire arrays. These heat supplies were used to maintain the desired operating pressure inside the storage vessel.

2. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Western Operations Office
150 Pico Boulevard
Santa Monica, California, 90406
Reference: B65-10379

Patent status: NASA encourages commercial use of this innovation. No patent action is contemplated by NASA.

Source: The Garrett Corporation
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